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OBSERVATIONS

ON

LACERATION

OF THE

CERVIX UTERI:

ITS ETIOLOGY, PATHOLOGY, PREVENTION,  
AND TREATMENT.

BY

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W. GILL WYLIE, M.D.,  
NEW YORK.



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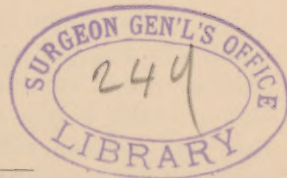




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A THOROUGH acquaintance with the literature of this subject, since the first publication by Dr. Thomas Addis Emmet, has shown me that a number of points of greater or lesser importance in the causation, pathology, prevention, and treatment of this lesion appear to have been overlooked by authors. It is the object of this paper to discuss these points and, above all, to endeavor to offer some new ideas on this, of late, so much ventilated subject.

Aside from what was seen during three years' hospital service, eighteen months of which were spent in the Woman's Hospital of the State of New York, these observations are based upon a study of forty cases of labor and thirty-eight cases of lacerated cervix, operated upon by myself in private practice, besides many cases of laceration of the cervix, in which the operation was not a necessity. About one-third of these cases were patients before pregnancy, and I had full opportunity to study the condition of the cervix uteri before, during, and after labor. Twelve of the labor cases had been under my care for uterine disease before pregnancy. In three of these I failed to prevent troublesome lacerations, one of this number has been operated upon, and two now need the operation to effect a cure.

In my practice since 1873, in all cases of labor, a modified form of Listerism has been carried out, and in no instance has there been the slightest sign of puerperal fever or cellulitis. Of the thirty-eight cases of laceration of the cervix uteri operated upon, two among the first had small fistulous openings along the line of the sutures, on account of failure of the edges to heal. One of these finally healed up, and the other gave no trouble. Two cases were followed by renewal of inflammation in old deposits of cellulitis or peritonitis, but were confined to bed less than



three weeks. One recovered entirely from the effects of the inflammation in eight months, the other in twelve months, and both have realized the good results of the operation. So far as curing the laceration, all may be called successful; but in several I failed to remove all of the diseased tissue, and in others left the cervix so long that afterward retroversion necessarily existed.

I have seen three of those operated upon that have since borne children; in all, the cervix remained intact, and I detected no apparent change, except that in one case the cervix was flattened out, but was healthy. One patient is now pregnant, who became so two months after both the cervix uteri and the perineum were sewed up. She is forty-two years old and has not had a child for nine years, during which time she has been a great invalid. Four cases of extensive laceration of the cervix uteri are now undergoing preparatory treatment. One of these I saw first when only six weeks pregnant. She had been ten years married, and never before pregnant. The cervix was hard, long, pointed, and sharply flexed on the body of the uterus. I afterwards delivered her, but could not prevent a laceration. The second is a delicate woman who gives a clear history of catarrhal disease of the cervix before the birth of her two children.

The third was under my care for a uterine fibroid about the size of an orange. A sponge-tent was introduced to dilate the cervix and was followed by an extensive abscess on the upper surface of the fibroid, which was submucous; this, by distending the uterine cavity, induced a rapid spontaneous expulsion and caused a laceration of the cervix uteri.

The fourth claims to have been perfectly healthy before the birth of her first child. At its birth, she was without medical attendance and was thirty hours in labor.

The history of laceration of the cervix uteri is of so recent a date, and the credit is so universally conceded to Dr. Thomas Addis Emmet for making known its importance and describing a simple and effective means of cure, that I will not here enlarge upon this subject.

#### *Etiology.*

Occasionally we will find a lacerated cervix caused by a uterine dilator or the forcible extraction of a large fibroid tumor



through the cervix, but it is during the birth of the child that laceration of the cervix commonly takes place. Labor is almost always the immediate cause; but there are other predisposing causes which, from observation of a number of cases, I am satisfied are of great importance.

I will first mention some general causes which may predispose to laceration of the cervix.

It is claimed by some that in this country, to a much greater extent than in any European state, the intellectual faculties are more generally forced to develop at the expense of the physical strength. If this is true, we may have the cranium become relatively larger than the pelvis and thus have more lacerations of the cervix. We do have in this country a great intermingling and consequent intermarriages between races widely divergent. It is a well-known fact that the mulatto, produced by a cross between a negro and an Anglo-saxon, is a very poor specimen and soon dies out, whilst a cross between a negro and one of the Latin race produces a much better stock, but still inferior in strength and in health to either parent race. This law, in races much more nearly alike, has, I think, much to do with the production of some of the feeble and ill-balanced part of our population. Besides, where races with relatively different sized, or even differently shaped heads, as, for instance, one being long and flat, the other round, intermarry, many of the children may have heads too large, or so shaped that they do not conform readily to the pelvis and cannot pass the cervix uteri without rupturing it. The great vitality of the Hebrew race may be accounted for by the fact that there are so few hybrids among them. Again, intermarriages of near blood relatives do, as a rule, result in imperfectly developed and unfinished children; and among the well-to-do class, where these creatures are able to reach maturity, tends to increase uterine diseases and deformities of the pelvis. What I most desire to draw attention to, are the abnormal conditions of the cervix uteri itself and adjoining tissues, which act as important predisposing causes of laceration. Some of these are:

- 1st. Imperfect, or abnormal development of the cervix, either supra- or infra-vaginal.
- 2d. Flexions of the cervix.
- 3d. Induration, or loss of substance of the cervix.
- 4th. Diseases of the mucous membrane, or other parts of the cervix.
- 5th. Induration and contraction of the ligaments attached to the cervix.

6th. Deformities of the pelvis, or tumors that displace the cervix.

As a rule, a diseased or abnormal condition of the cervix will prevent impregnation, but there are many exceptions. Among civilized people, where the law of "survival of the fittest" is interfered with, many girls with inherited feeble organizations reach and pass puberty with unfinished, imperfectly developed genital organs. When one of these becomes pregnant by a large and vigorous man, the cervix will, in all probability, be incapable of dilating sufficiently to allow the child to pass without tearing. Then there are others who, from sickness, bad hygienic conditions, or from other circumstances, are compelled to use up the force that should go to develop the genitals, reach maturity with imperfectly-developed organs. Among this class, very few escape having subacute catarrhal disease of the throat, and many of them have a similar disease of the mucous membrane lining the cervix uteri, its follicles and glands are diseased, and in some cases the underlying tissues are hardened and flexed. Of course, many of these cases reach a point where impregnation will not take place; but in others, later, the general health improves and the local disease subsides sufficiently to admit of impregnation, yet not before serious structural changes have taken place in the cervix. Even in cases where the disease is present, just after a free menstrual flow, the secretions may be for a time nearly normal and impregnation will take place and the mucous lining of the cervix continue diseased throughout the period of pregnancy. Such cases are very sure to tear during labor; and even when the laceration is comparatively slight, may be very troublesome.

In cases where there is induration and flexion of the cervix, pregnancy is rare, but does sometimes take place even when the cervix is hard, small, pointed, and sharply-flexed, as I have seen. From some observations lately made by examining patients just before, during, and after menstruation, I am satisfied that in some instances, even where the flexion is very decided, it is not constant during the whole month, and at times the uterus will be found straight. Besides, we do not know how orgasm may influence a flexed uterus. Now, when one of these cases with a small and hard or a long bent cervix does become pregnant, the cervix will soften in a great measure before labor, but does not always become soft and perfectly normal. Even when it



does soften, the tissue that has never developed or has undergone atrophy is still missing, and the cervix will be relatively feeble and small.

In cases where the cervical tissue is hardened or is deficient from the effects of a syphilitic ulcer, or hardened and cicatrized by escharotics, the mucous membrane and deeper tissues are very apt to tear, even where the labor is normal in every other respect.

Any disease, as cancer, which affects the structure of the cervix, may be a predisposing cause to laceration during labor. Placenta previa, by softening and rendering more friable, may influence laceration of the cervix, aside from necessitating a hurried labor.

Usually, extensive cellulitis or peritonitis prevents impregnation, but we do see cases become pregnant where the cervix is drawn out of position by the contraction of ligaments due to local peritonitis or an abscess. The change that takes place during pregnancy may restore this tissue to a normal state, but it does not always do this, and when the head descends upon the os, one part of the cervix is held up, while the other is carried down, and thus laceration is caused. Besides, if this contracted condition reaches the tissues of the cervix, its elasticity is decreased. When a laceration does begin in an abnormal cervix, the pain caused, even where only the mucous membrane is torn, may be so severe as to greatly add to the voluntary efforts at expulsion, and, at the same time, materially increase the intensity of the uterine contraction, and thus cause a deeper laceration by rapid distention.

The immediate causes which tend to rupture the cervix during labor, even though the condition of the cervix is normal, are:

1st, abortions and premature labors, *where delivery takes place soon after labor begins*; 2d, a rapid labor or one in which *the presenting part quickly dilates the cervix*; 3d, early rupture of the membranes; 4th, dry labor, where the amount of fluid is very small; 5th, retarded or protracted labor; 6th, instrumental labor; 7th, abnormal presentations, especially where delivery is manual; 8th, an abnormally large fetus or head.

After impregnation, the cervix undergoes a change, and very soon becomes larger and softer, and for several weeks or days before labor, still further enlarges and softens, being evidently

a preparatory condition to enable the cervix to dilate to the greatest extent, and allow the head to pass without rupturing. Now, in cases of abortion and premature labor, unless they are retarded, the cervix will be dilated before it has had the advantage of this preparatory stage, and thus even a comparatively small fetus may cause laceration. Dr. Emmet claims that criminal abortion is very often followed by laceration. I think this is due to the fact that these cases are usually effected by rupturing the membranes, and, thus, the more or less solid and irregular and dry fetus and membranes come directly against the cervix, unprepared for dilatation, and instead of efforts being made to somewhat retard expulsion, as is usually done in cases of abortion from other causes, the delivery is hastened, and thus the cervix is much more likely to be torn. Besides the softening that takes place before labor begins, each pain gradually stretches the os, which undoubtedly, during this time, undergoes changes, aside from being merely stretched; for immediately after labor it is much larger and its tissue softer than just previous to labor. Where the presenting part is rapidly forced through the cervix, not giving time for these changes, rupture is likely to occur.

In normal labor, the smooth elastic bag of waters gradually, with pressure evenly distributed, dilates the cervix; but in cases where the membranes are ruptured early, the more or less irregular and rough head comes directly in contact with the cervix, and is much more likely to tear it; besides, if labor is retarded, the parts soon become dry and sticky, and further add to the likelihood of rupture. For the same reasons, in dry labors and in cases where the fluid is too scant to act as a dilating pouch and to keep the parts lubricated, there is likely to be a laceration.

The cervix requires a certain time to get soft and elastic, but if labor is long retarded, the tissues of the cervix will become *dry and calcareous*, and to a considerable extent lose their elasticity, and are likely to be torn. In such a case, one side of the cervix may catch or stick to the head and be carried downward, while the rest of the cervix slides upward, and thus necessitates greater dilatation to allow the head to escape. Besides, in retarded labor, the liability to inflammation is increased, and this may make a slight laceration become a very serious affair. In retarded labor, any cause which compresses the cervix be-



tween the presenting part and the bones of the pelvis may injure the tissues of the cervix, so that, when further dilatation does take place, it will rupture at this point, and may allow the fetus to be expelled from the uterus without its passing through the external os.

The cases where the tear begins above the external os, or where there is sloughing caused by pressure, are those in which fistulae are apt to complicate the case. In these cases, the rupture takes place when the head is well down in the pelvis and has carried the more or less undilated os with it; and I believe that some of these cases, where the cervix is carried before the head, as it were, are caused by an abnormal condition of the tissues that unite the cervix with the body of the uterus, which condition may be due to either congenital or acquired weakness of this part.

Instruments, when judiciously and skilfully applied, ought more often to obviate laceration of the cervix by preventing or modifying retarded labor than cause it. Yet, when improperly applied within the cervix, or when they are used to forcibly and quickly drag the head out of the cervix, they may cause very serious lacerations. Unusual or abnormal presentations which cause the presenting part to be irregular, or necessitate manual labor (especially those in which the membranes are early ruptured), may cause laceration; a monster or a very large head may necessitate a laceration in delivering.

### *Diagnosis.*

The diagnosis of laceration of the cervix cannot be made until the child is delivered, and then the accident is not always easily detected on account of the softened condition of the parts. A steady stream of arterial blood keeping up, when the uterus is known to be firmly contracted, is, perhaps, the most reliable indication that there is a serious rupture of the cervix. Aside from physical examination, the next indication would be a continuance of the lochial discharge much beyond ten days. One of three things would be indicated by this—a very bad general condition, retained placental tissue, or a lacerated cervix. After the patient was up and about, beyond profuse discharge and perhaps some blood or discolored discharge, there would be no symptoms different from those produced by some form of displacement, and later on those caused by disease of the mucous

membrane of the cervix, and only physical examination could make the diagnosis certain. It is usual to examine first with the index finger of one hand in the vagina, and the other hand on the abdomen. In a recent case of a few weeks' standing, the finger readily distinguishes the soft edges of the wound, and makes out the depression caused by it. Usually the parts would be so movable as to allow the finger to pass to the depth of the tear, and the uterus could be felt above. In cases complicated by cellulitis or local peritonitis, there would be tenderness and more or less extensive induration and immobility of the parts.

Later the tissues would evert and become harder, and in cases where the involution of the body has taken place, the cervix would be felt to be larger than the comparatively small and firmly rounded body of the uterus. Much depends upon the amount of induration and eversion as to whether the case could be clearly diagnosed with the finger; whether it is a single or a double laceration; if single, which side is lacerated, etc. For making further examination, a Sims' speculum, two tenacula, a flexible sound and depressor are the instruments needed. By putting the patient in Sims' position, introducing the speculum, and bringing the cervix into view, in a recent case, the ragged edges of the tear, its direction and extent are readily made out. But in cases of long standing, where the tissues are hardened and everted, it is not always easy to make out the side that is lacerated, and, if double, which side is most torn, etc. The whole surface may be so flattened out that the line of the tear is apparently very shallow, or so covered with granular erosion as to be difficult to determine. In some cases, distended and burst cysts can be both seen and felt. In some, erosion is extensive; in others, only a small line or spot is broken, and especially in very old cases, all except this small line or spot being hard, tense, and bluish, with usually several round nodules formed by diseased cysts, filled with a thick, tenacious, gummy-looking fluid. With few exceptions, the sound will measure more than the normal depth. In many cases, the uterus is prolapsed and retroverted; in others, flexed.

Cases of subinvolution, caused by retained placenta or other influences, may be mistaken for laceration when the cervix is enlarged and flattened.

Where the laceration is slight, or filled with eroded granulations, or in cases where the latter are extensive, it may somewhat

resemble malignant disease of the cervix. Rest in bed, with the use of hot-water vaginal injections, will soon make differential diagnosis easy. Some of the cases where the cervix presents an irregular and apparently fissured condition, that are supposed to be cases of slight laceration which have healed, are, in fact, merely folds and wrinkles in the mucous lining, caused by its failing to resume its former shape after once being greatly stretched.

There seems to be a superabundance of mucous membrane in such cases. This may be due to the existence of disease of the mucous membrane, or to its failure to undergo involution to the same extent as the muscular tissue. It is in this way that a very slight laceration may give much trouble, and by eversion give the impression of an extensive laceration. Cutting out the diseased tissue and bringing together healthy edges readily cures. After the diseased tissues are cut out with a sharp knife, the sutures should be put in with the greatest care, for the deeper muscular tissues are not always involved in the wound, and may be thrown out of proper relation with the opening left in the mucous membrane when sutures are used.

I have also seen cases where the whole cervix seemed flattened out and much shortened up, yet no signs of laceration could be found sufficient to account for the everted condition of the mucous membrane, and I think this is due to the fact that many of the circular fibres had been torn or had been so stretched that they never afterward recovered their power, as is sometimes seen in the sphincters of the rectum, and, on this account, the mucous membrane was too abundant, and was everted in proportion to the shortening of the cervix.

If previous to pregnancy the cervix was long, after labor when involution takes place, the muscular part of the cervix might shorten considerably even when not ruptured, and thus leave a protruding and everted mucous membrane.

The line of laceration through the mucous membrane does not always indicate the full extent and depth of a laceration, especially in very old cases, particularly if they have been treated for "ulceration" in years or months past, for the mucous membrane may not have been torn, or may have healed, leaving some deeper tissue ununited, or have been sufficiently destroyed to force contraction of the mucous membrane, and cause it to slide down and cover the deep laceration in the muscular tissues



above. Except in cases where the mucous membrane is diseased, or in those where the cervix is abnormally long, *a laceration not extending, when first torn, to the vaginal junction, or even higher internally, rarely gives trouble, unless complicated by inflammation, etc.*

### *Pathology.*

Why is it that lacerations of the cervix are so commonly found to be through the lateral, and comparatively rare through the anterior and posterior walls? It is said by some that lacerations posteriorly and anteriorly do occur as often, if not more frequently than lateral lacerations. I am satisfied that there are very good reasons why lateral lacerations are much more frequent than those of the anterior or posterior walls. First, the longest diameter of the pelvis at the brim is transverse, and, therefore, the longest diameter of the head is directed transversely; besides, the position of the bladder and the rectum tend to further shorten the antero-posterior diameter, and thus make the transverse position of the head more fixed.

Second, the position and attachments of the ligaments of the uterus have much influence in causing the laceration to be lateral. The uterus lies between folds of the peritoneum and fasciæ, and these, together with the ligaments, are firmly attached anteriorly and posteriorly, and not to the same extent laterally, where these tissues separate to allow access of the blood-vessels, lymph-ducts, and nerves to the uterus. Especially is this true of the lower portion of the organ, where the utero-vesical and utero-recto-sacral ligaments are attached. These ligaments give to and receive from the uterus fibres of muscle and other tissues, which tend, not only to strengthen greatly the anterior and posterior walls of the cervix, but also to hold up and forward the anterior lip, and to hold upward and backward the posterior lip against any downward force beyond a limited extent.

Third, the position of the rectum and bladder, aside from helping to direct the long axis of the head transversely, are, in a measure, supporting-pads to the anterior and posterior walls of the neck when fully dilated, and thus help to prevent laceration anteriorly or posteriorly, except in rare cases, where the lower part of the cervix, not being fully dilated, the upper part is forced so firmly and persistently against the pubes as to cause



death of tissues and sloughing or weakening of the tissues, so that they tear when further dilated by the passage of the head.

Fourth, the structure of the muscular walls of the cervix is such as to favor the anterior and posterior walls. The cervical canal is wider transversely than antero-posteriorly.

The reason why the laceration is more frequently found on the left than on the right side is, that the uterus is normally suspended in the pelvis with the fundus slightly to the right and the cervix slightly to the left side, and this position causes the impact of the presenting part, which is, in the large majority of cases, the occiput, to be deflected more strongly toward the left than to the right side.

Lacerations involving both sides of the cervix are quite frequent, but I cannot remember ever seeing one in which both the anterior and posterior lips were torn. In a rapid labor, it would seem that double lacerations may be caused when the cervix is dilated and greatly thinned out by both sides giving way simultaneously. Or, in retarded labor, where the anterior and posterior walls of the cervix are pinned against the pelvis, the tissues being edematous and dry, are not able to slip from side to side, and each lateral segment is torn either at the same time or separately.

In studying the changes which occur after laceration of the cervix, the subject is simplified by taking into consideration that the cervix is composed mainly of three tissues: 1st, the mucous membrane with its glands and follicles; 2d, the connective tissue (in which are some muscular striæ) and fasciæ that bind all the other parts together, and projecting out between the folds of the peritoneum from the points of attachment, and to a great extent make up the ligaments that support the uterus; 3d, the deeper muscular tissues of the cervix (mainly circular). Besides, the condition of the tissues at the time of being torn must also be taken into consideration, for the pathological changes are greatly influenced by this condition.

When the muscular fibres are torn, the connective tissue, and almost always the mucous membrane, is ruptured; but the muscular fibres may give way and tear apart beneath the mucous membrane, just as is the case sometimes in the perineum. The rent in the mucous membrane may be very slight compared with the tearing of the deeper tissues. After laceration of the muscular tissues during labor, as many of the fibres are circular and are

retracting, there will be a tendency of the edges to gape, and this tendency is kept up by the process of involution. The vagina is itself enlarged, and it must undergo involution before it could exert much influence in keeping the edges together, yet the resilience of all the tissues surrounding, produced by atmospheric pressure, does tend to hold the edges together; but even when kept perfectly clean and uncomplicated by cellulitis or too early getting up of the patient, the union of all the muscular fibres would hardly be secured, and in extensive laceration there would be more or less of a notch left which may disappear later by being flattened. Many cases when uncomplicated do heal up to such an extent that they cause no trouble. Now in cases of imperfect development, or in those where previous disease has caused atrophy of the muscular tissue, once being torn apart, the rent does not unite when left to nature, even though all the circumstances are favorable.

The connective tissue is involved to some extent in most lacerations, but produces bad results mainly by becoming the seat of inflammatory infiltration. And in complicated cases it becomes an important factor.

The mucous membrane is more or less torn, in the majority of labor cases, and when healthy and uninfluenced by underlying cellulitis heals, leaving only very slight notches or scars. In a case of granular erosion, or one with a cervix filled with diseased cysts, feeling like so many imbedded shot, pregnancy may occur; be as careful as you may, yet in delivering you are pretty sure to have a ruptured cervix on hand when the head passes. You may have an extensive rupture, but even a slight laceration, where little more than the mucous membrane is involved, may prove troublesome, and the swollen, everted, and eroded membrane will not heal satisfactorily unless you cut away the diseased tissue and bring the edges together with sutures. In many cases of long standing, it is not easy to determine to what extent the different tissues have been torn, unless the parts are first softened by constant pressure made by tamponing. In cases where extensive subinvolution still exists, the tampon will merely flatten and soften the neck; but in cases where the body of the uterus is small and involution is more or less perfect, the tampons create a very great change. By the touch, the firm, hard, muscular tissue is felt to be little larger than when normal, and the gaping edge of the notch caused by

the laceration can be plainly made out. The mucous membrane has lost its dull bluish color, it is redder and much softer, showing plainly the line of laceration with its granular, broken-down edges. The connective tissue has lost its infiltrated matter and allows the stretched and superabundant mucous membrane to slide about with the greatest freedom. In this state operate, and it will be plain to you that the dense gristly tissue which has broken so many needles for us is in reality not cicatricial tissue, but often, if not always, the close, firm muscular or elastic fibres of the cervix, perhaps somewhat hardened by hyperplasia of the connective tissue. One has only to attempt to pass a thick short needle through the normal deep muscular tissues of the cervix to be convinced how hard and tough it is. While the tissues are softened in this way by tamponing, you will readily see the reason why the depth of the uterus is frequently shortened by an operation which it would seem should lengthen the canal. The infiltration or induration of the mass of connective tissue which separates the mucous membrane from the muscular tissue is eliminated. In other words, the sutures tend to approximate the muscular tissues and the mucous membrane, and thus shorten the depth of the canal.

In cases where there is much subinvolution, the shortening of the canal is not so evident just after the operation, but appears later, being due to the influence of the operation in inducing completion of involution. There is no doubt but that, next to the removal of diseased tissue, the stimulative effect of the operation upon this dormant power of involution accounts for the remarkably beneficial effects on the health of the patient. In the same way, a relaxed subinvoluted condition of the vagina and perineum may be cured by an operation on the perineum barely torn at all.

What causes eversion of the tissues when the cervix has been lacerated?

1. The condition of the cervix at the time that it is torn.
2. Increase in size from congestion, infiltration, or hyperplasia of the soft and vascular mucous membrane and of the connective tissue in and near the laceration.
3. Cystic degeneration of the glands and follicles of the cervix.
4. Swelling or thickening or contraction of the adjoining connective or peritoneal tissue which *interferes with the circulation* of the cervix or puts upon the stretch any ligament attached to it.



5. While in the upright position, if the uterus sinks low in the pelvis, the pulling apart of the surfaces of the laceration by the suspensory ligaments.

6. Under certain conditions, pressure on the posterior wall of the vagina and underlying parts or floor of the pelvis.

7. Displacements of the uterus.

If at the time of the laceration the tissues of the cervix are inflamed or diseased in any way, the tendency to repair is interfered with, and the likelihood of inflammation and swelling very much increased. After labor, the cervix must undergo involution to return to the normal size of an unimpregnated uterus. If the parts are healthy and the conditions favorable, repair may take place more or less perfectly; but if, on account of existing disease of the mucous membrane or on account of irritating or poisonous discharge, the repair is delayed, then the process of involution has much to do with eversion of the tissues. Involution of the parts involved in the tear would be retarded and they would remain large, while the body of the uterus and a part of the tissues of the cervix would undergo contraction, and on account of the muscular fibres being circular, with others running from the body to the cervix, their contraction would tend to squeeze out of the canal the soft and swollen tissues of the line of laceration and greatly interfere with its circulation. In cases where subinvolution is more general, as this adds weight to the organ, the tendency to eversion would be increased when the patient is in the upright position.

In a normal cervix, when intact, the lining membrane is under gentle pressure which is removed by laceration, and thus swelling may take place unless repair occurs rapidly. When the continuity of the tissue is destroyed and swelling takes place, the swollen tissues will protrude in the direction of least resistance and thus cause eversion, and it is on this account that inflammation which causes congestion and infiltration adds greatly to the eversion, at the same time increasing the weight of the parts. Cystic degeneration causes swelling of the mucous membrane and consequent eversion. Cellulitis and infiltration in the adjoining tissues often puts the uterine ligaments greatly on the stretch and thus leads them to pull open the wound, or by obstructing the circulation causes increased swelling and eversion. If the cellulitis chiefly involves both broad ligaments, the eversion may not be so great, but the cervix will gape widely



funnel-shaped) and gives the impression that it is torn internally much more than externally, that is, that the inner layer of muscular tissue is chiefly involved. Contraction after local peritonitis or an abscess, when it shortens a ligament attached to the cervix, will also pull open the wound. Fibroid and other tumors may influence eversion.

After laceration during labor, usually in a short time, the uterine ligaments return to their former condition, and when the patient is in the upright position—if for any reason, such as straining at stool, the uterus sinks in the pelvis—the ligaments attached to the cervix would tend to pull apart the lacerated edges, and would act more powerfully in proportion to the weight of the organ and the extent of the laceration. As the principal points of attachment of these ligaments are to the anterior and posterior walls, the eversion caused by this force is greater when the laceration is lateral. (Some muscular fibres and fasciæ that go to make up the ligaments extend down into the infra-vaginal part of the cervix.)

When from too early getting up of the patient, or in cases where subinvolution extends to the ligaments, or when from any cause the uterus is prolapsed and not retroverted to great extent, the lacerated cervix would be flattened out and irritated by its own weight, pressing the cervix against the posterior wall of the vagina and the underlying tissues which form the floor of the pelvis. In such a case, where the uterus is somewhat anteverted, this pressure is more or less evenly distributed on both the anterior and posterior flaps, but when the uterus tends to deviate backward from the normal position, most of the pressure is on the posterior lip, while the anterior lip is free to extend down the vagina. This in some cases accounts for the disproportion in the length of the two flaps not uncommonly met with. Now, when there is complete retroversion, both flaps slip down the vagina as far as the ligaments will permit. When in this latter position, if the patient keeps in the reclining posture, the eversion will decrease, but when upright, the suspensory ligaments will in time cause marked eversion.

Except in cases where involution of the vagina is very rapid compared with that of the lacerated cervix, I cannot see how it can influence the condition of the cervix. It is a soft flexible tube, and when not distended, its anterior and posterior walls are in contact. If the vagina is small and the lacerated cervix large

enough to distend its walls, then, of course, the shape of the cervix might be altered by the vagina. But after labor the vagina is large, and when the uterus is prolapsed, the capacity of the vagina is very much increased and would not be likely to greatly influence the shape of the cervix.

*The influence of displacements on the cervix uteri after laceration.*

In antelexion, as the fundus bends forward it puts on the stretch the posterior wall of the uterus, and in time this force shortens the deep layer of muscular fibres of the posterior lip of the cervix. At the same time, the mucous membrane and more superficial connective tissue is held down by the vaginal attachments, and this prevents much eversion. While this change is taking place in the posterior lip, the anterior wall of the uterus bent on itself is crowded down and the anterior lip of the cervix is rolled out in marked contrast with the posterior. The ligaments attached to the anterior lip of the cervix resist the tendency of the cervix to go backward and upward when the body is antelexed, and this also increases the eversion of the anterior lip.

Now, when the uterus is retroflexed, the posterior lip is not pushed out and everted to the same extent as the anterior would be by antelexion, for as there is more or less prolapse, the cervix comes in contact with the curved floor of the pelvis posteriorly and is thus kept back, or if it slides down the vagina, the flexion is straightened out and retroversion and prolapse take the place of retroflexion. Anteversion has much the same influence as antelexion, and retroversion the same as retroflexion.

Prolapse of the uterus from its own weight, when the cervix is deeply lacerated, causes marked eversion by the ligaments pulling back the two lips. But when the uterus is pulled down by traction on the lower end of the vagina, the tendency may be to slip the mucous membrane and superficial tissues off from the deeper layer and obliterate the line of vaginal junction with the cervix. Displacements, especially prolapse, of the uterus greatly interfere with the normal circulation of the organ, and the swelling caused by this increases the eversion of the lips when the cervix is lacerated. Laceration occurring in an elongated cervix, even when uncomplicated by the slightest signs of inflammation or subinvolution, often will not heal, yet give no trouble after labor until displacement takes place, as the result

of the cervix still being too long to remain in a normal position, or of a lacerated perineum. As the uterus sinks in the pelvis, swelling begins, and soon the lacerated cervix everts, etc. I have watched just such a case through every stage and expect to cure it only by removing a part of the cervix and sewing up the tear beyond where I amputate the cervix.

Some of the same causes which produce eversion, by obstructing the circulation and by irritation, keep up and intensify any existing disease of the mucous membrane. This prevents the process of repair from exceeding or being equal to the waste or death of the tissues and thus causes erosion, diseased glands and follicles, and faulty secretions, and in some cases a hyperesthetic condition in the wound, which by reflex action greatly disturbs the health of the patient. I cannot accept Dr. Emmet's theory, that it is a "cicatricial plug" which causes this hyperesthetic state. It seems to me to be a condition similar to what is found in other portions of the mucous membrane where there certainly is no "cicatricial plug." I refer to sensitive spots that I have found in the cervix of virgins, in the female urethra, and in the prostatic portion of the male urethra—points that were equally sensitive and produced very similar reflex disturbances. Undoubtedly the pressure caused by infiltrated tissue, or the contraction of cicatricial tissue on terminal points of nerves, may have a bad effect, but in many of the cases most influenced by reflex disturbances the induration is slight and no scar formed. Imperfect nutrition or prolonged irritation would seem to be more directly a cause of this hyperesthetic state than pressure from a scar. Interrupted pressure, such as may be induced by irritating a sphincter muscle, may increase or even start up such a condition, but steady pressure causes death and atrophy rather than disease.

I do not claim that there is no cicatricial tissue in the angle of the wound, but that there is no "cicatricial *plug*" at the bottom of this angle. Such an idea comes from the old and erroneous belief that a deep open wound "fills up with granulations." These wounds do close up, either by the edges becoming depressed or by the adjacent tissue being drawn into the space, but, "the granulations and the scars of deep open wounds remain alike thin and depressed" (Paget). This is equally true of a lacerated wound of the cervix. A scar may be there, but no plug of that nature. What by some is supposed to be a "cicatricial



plug" is the firm, hard muscular tissue, perhaps somewhat changed by hyperplasia of the connective tissue, covered by an old scar with more or less mucous membrane drawn up over it at the angle. In old cases, the epithelium of this mucous membrane may be very much thickened by prolonged irritation, and there may be hyperæsthetic nerves somewhere beneath it, but we could no more call this a cicatricial plug than a clavus (corn). (May it not be a clavus of the mucous membrane? One of the functions of the mucous membranes is to protect the underlying tissues. May not this thickened epithelium be a functional hypertrophy?) Scars are hard, but they are thin, and deep cutting of the angle is not necessary to remove the cicatricial tissue; but since the deeper circular muscular fibres when torn retract, in time, when the edges are flattened down, the sides of the wound are no longer the straight lines of an angle, but are the curved lines of an arc and cannot well be brought into apposition without using considerable force, unless the sides are first made straight by cutting out a triangular piece at the centre of the wound. This triangular piece may be covered by a scar, by granulations, or by mucous membrane, but it is not a "cicatricial plug." It would indeed be a serious matter to go to work to cut all the hard tissue at the bottom of the wound.

When the cervix is divided with a knife or a pair of scissors, as this makes a smoother surface than when torn apart, and is usually done while the cervix and uterus are small, eversion and its attendant results seldom ensue. But, if the operation is followed by inflammation, or if the mucous membrane is diseased, there may be eversion and erosion, etc. Much depends upon the extent of the tissues cut, whether all the tissues of the cervix up to the vaginal junction are cut entirely through, or whether only the inner muscular layer, in which lie most of the circular fibres, is divided, and the mucous membrane is cut only just slightly beyond the crown. The latter can be done thoroughly with Sims' uterotome, and is just as effectual and is little likely to be followed by eversion.

#### *Prevention of Laceration of the Cervix.*

From the success that I have had in the last twelve cases of labor, I am satisfied that much can be done toward prevention of laceration, and when it must occur, as is often the case, the extent of the laceration may be limited, and the serious after-



effects prevented in almost all cases by treatment before and close attention during labor.

When a woman becomes pregnant, it must not be taken for granted that the neck of the uterus is perfectly healthy, or if it is in good condition at this time that it will remain so throughout pregnancy.

Morning sickness to a moderate extent may occur without any perceptible disease of the cervix, but, as a rule, it is a pretty certain indication that there is an unhealthy condition of the neck of the uterus. For several years past, I have not seen a single case of this distressing condition that did not yield in a few days to local treatment, while several of my cases were not helped by the usual remedies.

If, during pregnancy, there is nausea, leucorrhea, or any indication of disease of the cervix, an examination should be made and the case treated, not only to relieve the symptoms, but in order to get the neck of the uterus in a healthy condition before labor.

The danger of inducing an abortion by treatment is by no means as great as I at first supposed it would be, and I think that with reasonable care many more cases of abortion and premature birth could be obviated than would be caused by the treatment. Applications can be made to the cervix and for at least three-fifths of an inch within the canal, and tepid vaginal injections can be safely used during pregnancy.

For the relief of nausea, I have found dilatation of the canal for three-fifths of an inch to be, so far, perfectly successful in relieving this symptom and in softening the hardened condition of the cervix so commonly associated with, and perhaps causing the vomiting. Sometimes the index finger introduced to the first joint will answer, but in many cases, especially in primiparae, it is very difficult to get even the point of the finger into the cervix. I now use a modified uterine dilator bent nearly at right angles, so that not more than three-fifths of an inch can enter the canal; it is opened by a screw adjustment which enables you to regulate the extent of dilatation, and its shape makes it easy to introduce it even when the cervix is, as it often is, very high and far back in the pelvis. In some cases, there will be slight hemorrhage after even moderate dilatation, and usually one dilatation completely relieves all vomiting. After dilatation, the neck soon becomes shorter and much softer.

I caution my patients when pregnant to be careful, at the time that they would expect to have their menses if not pregnant, and to be especially careful if any of the usual premonitory symptoms should become manifest, for I am satisfied that at this time abortion or premature labor is most likely to occur.

If not successful in correcting any trouble of the cervix, and there is any discharge, vaginal injections are to be used, and for some days before labor is expected antiseptic injections are used once a day. In all cases I have the nurse come early, and if these carbolized injections are not used before, one is given at the first indications of labor beginning, and everything must be in readiness for the carrying out of a somewhat modified form of Listerism during and after labor, until the discharge ceases. And an examination is carefully made of the cervix and uterus before the patient is allowed to sit up. If obstetricians would take as much pains to prevent laceration of the cervix uteri as they do to prevent laceration of the perineum, much would be done toward obviating this accident. They should avoid rupturing the membranes until it is absolutely necessary. In a rigid os, carefully and slowly assist dilatation with elastic dilators. In dryness of the parts, freely use lubricants. When the pains are very powerful, and the voluntary efforts at expulsion violent, the latter should be controlled, if necessary, by chloroform at the time of the head passing the cervix, and one or more fingers be kept against the head, and an effort made to regulate and modify the more violent efforts at expulsion. Sometimes an opportunity will be found to help the cervix over a part of the head, where it is retarded more than at other points.

It is true that many cases of lacerated cervix give the history of forceps being used, but this may be due to the fact that those conditions which necessitate the use of forceps are often the same in which a laceration of the cervix would take place whether the forceps are used or not. To avoid lacerating the cervix by the use of forceps, it is well to dilate the cervix as much as can safely be done before they are applied, to decide as early as possible that forceps are necessary, and to handle them skilfully, adjusting them accurately, and pulling steadily and in the right direction and at the right time. Forceps, timely and skilfully applied in retarded labor, often prevent sloughing and some of the worst forms of lacerated cervix.

*Sequelæ and Complications.*

Hemorrhage; subinvolution; endometritis; erosion of the everted lips of the cervix; cystic degeneration of the mucous membrane; displacements of the uterus; inflammation of the connective or cellular tissue, and adjacent peritoneum; rupture of the perineum; fistulæ; malignant disease of the cervix; cicatrices the result of treatment with escharotics or prolonged and frequent use of powerful astringents; venereal disease.

The effects of most of these have already been shown, and they will be further considered under the head of treatment.

*Treatment.*

As a rule, uncomplicated lacerations occurring in a healthy cervix will heal so as not to need special treatment, provided the parts are kept clean and the patient remains in the reclining posture for two weeks or more.

When severe hemorrhage is caused by laceration of the cervix, the wound should be sewed up at once. In other cases, as a rule, it will be better to keep the patient in bed and use anti-septic vaginal injections, and allow Nature to heal the wound as far as she will. After the patient has fully recovered from the effects of her labor, allowing full time for involution to take place, if on examination a decided laceration exists, it should be sewed up without further delay, unless for some good reason the operation is contra-indicated. If the cervix is sewed up before the patient is much on her feet, not only will the laceration be cured, but all the sequelæ that may follow a lacerated cervix are prevented; whereas, if we wait for symptoms to indicate treatment, as these symptoms are the result of some complication—a displacement, inflammation, or some other serious disease—a complete cure is by no means certain, even by the best treatment. It is true that the laceration can be cured, but the displacement may necessitate the use of a pessary until the uterus is atrophied by old age. Besides, the bad effect of uterine disease upon the general health of the patient may become permanent.

Unless the laceration is sewed up just after the accident, when the edges are fresh, it will be better to wait until involution has had time to take place; usually six weeks' time is amply sufficient. After this, paring the edges and sewing up

the wound is not only the best way of curing the laceration, but the subinvolution that may exist at the same time.

Inflammation of the endometrium, or granulations extending above the point of laceration, should, as a rule, be treated before the wound is closed. Extensive erosions of the everted lips of a lacerated cervix should be treated by rest in bed, hot-water vaginal injections, and, if associated with induration of the cervix or adjacent tissue, pressure, with carefully graded tampons, should be made, and, in case of the surface being so sensitive as to bleed when touched, astringents should be used, but not oftener than twice a week. After this is cured, if a distinct laceration exists, it should be sewed up to prevent a return of the trouble.

Cystic degeneration of the follicles of the mucous membrane is a common result in an old laceration of the cervix; and when it is of long standing, to effect a permanent cure an operation is necessary, for the trouble is so deep-seated that applications alone do not reach it unless they are strong enough to actually destroy the tissue. When the erosion is treated by caustics, a hard, tense scar is the result, and is pretty certain to give way and cause a sensitive, irritable ulcer.

Lacerations of the cervix are frequently complicated by displacements of the uterus. The laceration may be indirectly the cause of displacement. By adding to the weight, it may cause prolapse, or by causing uterine chronic disease, it may induce flexion or version. In slight or recent displacements, curing the laceration usually corrects the displacement by removing the cause; and sometimes even decided displacements may be cured by sewing up the lacerated cervix, for it may induce involution and give tone and strength to the ligaments, and restore them to a normal state. But it is safer to sew up the laceration early, for many cases when displacement is once established, will always need artificial support to keep the uterus in place.

By far, the most serious and troublesome complication of a lacerated cervix, is inflammation of the pelvic, cellular, and peritoneal tissue. A careful use of antiseptics in most cases will prevent this complication. When it does exist with a lacerated cervix, time must be allowed for it to become subacute. So variable is this trouble that no general statement would give a correct idea of all cases.



In comparatively recent cases, complete rest, external counter-irritants, and hot-water vaginal injections are about all that it is safe to do. After several weeks or several months, according to the character of the case, it may become subacute, and when so, by pressure and traction and counter-irritants, most cases can be got in good condition for an operation on the cervix in from two to six weeks. Even where there is much tenderness on pressure, and induration and adhesions firmly fixing the uterus in the pelvis, this may be done. In such cases, the general hyperæsthetic state of the pelvic tissue cannot always be removed by this preparatory treatment; but when you succeed in getting the uterus freely movable, it is safe to operate if antiseptic precautions are taken. My last case, done only ten days ago, was of this nature, and made a good recovery without either fever or pain. Often a laceration that has more or less healed up, will give no trouble until the uterus, after another labor, is left subinvolved, or is enlarged and congested by inflammation in or near it, when it begins to evert and erode, and soon presents a very bad appearance. It is true that *if you cure the inflammation and remove the swelling before the mucous membrane is too extensively affected, the patient will be relieved, but the same trouble is liable to recur.*

It is in this way that I account for some of the cases which give a reliable history of being torn during one labor, yet having no serious trouble until a second or third or even fourth child is born. After the first labor, it heals sufficiently to prevent trouble at that time, but after the second or third labor, on account of a want of cleanliness, feeble general health, or too early getting up, the old laceration is complicated by subinvolution or inflammation, and now compels the patient to seek relief.

Laceration of the perineum is a very common, and when it is sufficiently torn to affect the integrity of the floor of the pelvis, it is a serious complication of a lacerated cervix, for it very soon indirectly causes a displacement of the uterus. To prevent this troublesome and, in some cases, incurable result, it is best to sew up both the lacerated cervix and the lacerated perineum as soon as it is practicable. This should be done, if not before, at any rate, soon after the patient gets on her feet after labor.

As the same conditions that result in a vesico- or recto-vaginal fistula are liable to cause a laceration of the cervix, the latter is usually found in cases of fistulæ, and should be treated after the fistula is cured.

I have seen malignant disease on the lacerated edges of a torn cervix, but I have also seen so many other cases of lacerated cervix of long standing in which no cancer had developed, that I have not been able to fully accept the general opinion that it causes cancer.

Old cases of laceration of the cervix uteri that have been treated with escharotics are not uncommon, and they are often troublesome from old scars and adhesions in and about the cervix.

Too long or too frequent use of irritant astringents, such as Churchill's solution of iodine, will also contract the tissues to such an extent as to be a real complication. And it is partly this which has given some of our gynecologists an idea that the worst pathological conditions are caused by "cicatricial plugs."

One of the last cases that I operated upon was a good illustration of this. I saw the case in consultation. The induration was slight, but, as the erosion was quite extensive, I advised preparatory treatment. In three weeks' time, when I went to operate, the doctor had, by applying Churchill's solution of iodine, once in two days, reduced the erosion, but also had caused troublesome cicatricial contraction.

Too prolonged or severe preparatory treatment does harm rather than good. Application may be made so as to cause a cicatricial contraction, and large tampons, when kept in constantly for a length of time, tend to obliterate the line of junction of the cervix with the vagina, and to separate the superficial and deeper tissues so that it is much more trouble to pare the edges and bring them evenly together.

To what extent must a cervix be torn to require an operation for closing the rent? It would seem that I have already made this plain, but so much has lately been said about this, that I wish to be clearly understood. After giving Nature a fair chance to do what she will after labor, and after removing, as I have indicated, as far as practicable, any existing disease or complication, if a laceration still exists, with gaping, everted, or eroded edges, or any obstinate abnormal condition, such as cystic degeneration, etc., rather than treat it with the actual cautery, caustics, or very strong astringents, to force healing by granulations, I would pare the edges, remove any superfluous or abnormal tissue, and bring the parts together with silver sutures.

The actual cautery destroys more tissue than is usually necessary to do in paring the edges, and it makes an open wound, which must heal by granulation and leave a scar. The same thing may be said about the use of caustics; besides, as it takes many applications to destroy the tissue, it is even worse than the actual cautery, for it not only makes an open wound, but adds irritation by repeated applications. Powerful irritants in time produce a cicatrix much the same as though escharotics had been used.

Some of the men who believe that cicatricial tissue causes most of the bad effects of a lacerated cervix uteri advocate a plan of treatment which really makes a cicatrix, and one, too, that in many cases, after a few weeks or months, relapses or causes an irritable ulcer. If hysterotrachelorrhaphy was a dangerous operation, this would not be so strange. It seems to be due to one of two causes. Either the knife has been much abused in uterine surgery (what agent of power in medicine has not been?), or to the fact that many influential gynecologists have never learned to use the knife. It must not be forgotten that, less than a generation ago, the doctor who practised gynecology was pre-eminently a physician, and not a surgeon.

Hysterotrachelorrhaphy is usually a very simple operation, and when precautions are taken against sepsis (as should be done even in the most trivial operations), and care is taken not to operate during peri-uterine inflammation, there is, perhaps, no operation in surgery which accomplishes so much good with so little danger to the life or even the comfort of the patient.

It consists in freshening the edges of the laceration, and in bringing them together with sutures. If it is double, in paring the edges of both lacerations, leaving a space in the centre for the cervical canal, and sewing up both sides. When there is superfluous tissue that is abnormal, it is well to remove it when paring the edges. Sometimes when the superficial wound is small, after we cut through the mucous membrane at the angle of the wound, we will find that the laceration extends much deeper, even as high as the internal os. Such cases usually are old ones that have once been supposed to have been cured by applications. When the cervix is long, the mucous membrane abnormal, and the uterus retroverted, it is best to amputate the flaps, *leaving a cervix of normal length*, and sew up the laceration above this point; at the same time cover the cut surfaces



with mucous membrane in bringing the edges together, and leave an opening for the external os. In some of my early operations, I left the cervix long, and it remained so, and afterward necessitated the use of a pessary to prevent retroversion.

In those cases where the uterus has undergone involution more or less completely, the cervix being large, this enlargement may be due to hyperplasia of the connective tissue, and change in the mucous membrane, and when the edges of the wound are pared, unless care is used, the sutures will not reach the deep muscular layer, and only bring together the superficial tissue. Afterward, when the induration disappears, we may have a crooked cervical canal; that is, the opening in the deep tissues will not correspond with the opening in the mucous membrane. When this does happen, fistulous openings along the line of the sutures are apt to form. Hemorrhage is often somewhat troublesome, but rarely sufficient to do the least harm, and when so, well-placed sutures readily control it. As the cases that bleed most freely are usually those where the cervix is flattened out, and the tissues quite soft, I have never seen a tourniquet applied that did any good.

In those cases where a part of the cervix is amputated, and in those where the condition or the superabundance of the mucous membrane warrants one in removing it all the way around the canal, there is some risk that the opening left for the external os may close up, and the secretions from the body of the uterus may force an opening somewhere else. To obviate this, it is well to insert a tent of linen or cotton, and to see the case several months after the operation, and, if necessary, enlarge the opening by dilatation, in case it has become too small. After operating, I have carbolized vaginal injections given twice a day. I leave sutures in one week, and keep the patient in bed for several days after this.

It is important, before beginning to operate, to first make an accurate diagnosis as to the extent of the laceration, the side that is torn, or, if double, how much each is torn, and the extent of diseased tissue to be cut away, etc. When operating, I cut out the angle of laceration, not to get out a cicatricial plug, but to enable me to draw the edges evenly together, and to reach the firm, muscular tissues at this point. I may take out a small triangular piece of muscular tissue, but because it is hard and gristly, and of a white yellowish-gray color, is no evidence that it is



other than the firmly-contracted muscular tissue. The upper layer may be cicatricial, and the connective tissue may be somewhat hardened, but is no more a cicatricial plug than any other part of the same tissue near or involved in the tear.

When, with two tenacula, you can readily bring the flaps together (I do not mean when you can slide the mucous membrane up over the flaps, and bring the edges together), then they are ready for the sutures. From two to four well-placed silver sutures made to include the mucous membrane and thickened connective and other superficial tissues, and the *deep, hard, and gristly muscular fibre* on each side, are, as a rule, amply sufficient to secure close apposition of the sides.

When the tissues are firm, I prefer a Sims' uterotome to cut out the diseased tissue and pare the edges; when quite soft, a pair of curved scissors are better.

I prefer to use in this operation a sharp beveled-pointed needle, slightly curved near the point, and not less than three-quarters of an inch long.

The operation, although not dangerous or formidable, so far as the patient is concerned, is very troublesome and tedious to the operator. Even experts, in handling the necessary instruments, will take from twenty minutes to an hour or more, according to the case, to do the operation.

40 WEST 40TH STREET,  
Nov. 2d, 1881.





